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SCS ENGINEERS

January 23, 1991
File No. 0185016.01

Hazardous Materials Underground Storage
County of Los Angeles - Department of
Public Works
Waste Management Division
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Preliminary Site Investigation for Angeles Chemical, Santa Fe Springs, California - DPW File Number I-10173-3E

Dear Sir:

Enclosed are two copies of the preliminary site investigation for the subject site. The investigation was requested by your department under the Hazardous Materials Underground Storage Leak Detection Program.

In you have any questions, please feel free to contact either of the undersigned.

Very truly yours,

Daniel Roeser

Daniel Roeser
Geologist

Kenneth H. Lister
Project Manager
SCS ENGINEERS

Enclosures

cc: John Locke, Angeles Chemical

PRELIMINARY SITE INVESTIGATION REPORT
ANGELES CHEMICAL
SANTA FE SPRINGS, CALIFORNIA

Prepared for:

Angeles Chemical
8915 Sorenson Avenue
Santa Fe Springs, California 90670
(213) 945-3911

Prepared by:

SCS Engineers
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Long Beach, California 90807
(213) 426-9544

January 1991

0185016.01

TABLE OF CONTENTS

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REGIONAL GEOLOGY AND HYDROGEOLOGY

Angeles Chemical is located in the Los Angeles Coastal Plain at an elevation of approximately 150 feet above mean sea level. The nearest major fault zones are the Whittier Fault Zone located about 3.5 miles to the northeast and the Newport-Inglewood Fault Zone approximately 11 miles southwest.

Surficial sediments (to a depth of about 30 feet) consist of Holocene stream and flood deposits composed of interbedded gravel, sand, silt, and clay. Sediments underlying these belong to the Lakewood Formation of Pleistocene age. These also consist of interbedded gravels, sands, and silts deposited in a fluvial system. Distinguishing between these two units is difficult, if not impossible, in this area.

The site lies within the Central Basin Pressure area, a division of the Central Ground Water Basin which extends over most of the Coastal Plain. First regional ground water in the region is found in the Gage Aquifer within the Lakewood Formation which is approximately 45 feet below grade in the vicinity of the subject site. This ground water is of poor quality and is not potable. Ground water typically flows to the southwest in the Gage Aquifer.

ON-SITE INVESTIGATIONS

Drilling and Sample Collection - January 18, 1990

Eight soil borings (BH1 through BH8) were drilled to depths of 20, 20, 20, 23, 50, 20, and 20 feet. Boring locations are shown in Figure 2. Soil Samples were retrieved at five foot intervals as described in the approved work plan for the investigation (Work Plan dated April 23, 1986 with modifications listed in SCS letter dated March 14, 1989).

Soil samples were obtained by placing 3-inch and 6-inch long stainless steel or brass sample sleeves inside a Modified California Sampler. The sampler was then driven into the soil ahead of the hollow stem auger using a 140 pound slide hammer. Each time the sampler was retrieved, a representative sample from the lowermost intact sample sleeve was removed, covered with aluminum foil, sealed on both ends with tight-fitting plastic end caps, and secured with electrical tape.

FIGURES

TABLE

DISCLAIMER

This report has been specifically prepared for Angeles Chemical, with specific application to a preliminary site investigation for the property located at 8915 Sorenson Avenue, Santa Fe Springs, California. This report has been prepared in accordance with the care and skill generally exercised by reputable professionals, under similar circumstances, in this or similar localities. No other warranty, either expressed or implied, is made as to the professional advice presented herein.

PRELIMINARY SITE INVESTIGATION
ANGELES CHEMICAL
SANTA FE SPRINGS, CALIFORNIA

INTRODUCTION

Angeles Chemical retained SCS Engineers (SCS) to conduct an underground tank investigation program at Angeles Chemical, Santa Fe Springs, California (Figure 1). The purpose of this project was to test subsurface soils in the vicinity of the facility as a permitting requirement of the Los Angeles Department of Public Works. Current inventory control measures and tank integrity testing have not identified any leaks in the 34 underground storage tanks.

SURROUNDING LAND USE

All sites immediately adjacent to the subject site are zoned for and occupied by industrial facilities. Several of these properties have been identified on regulatory lists as having potential or identified environmental problems.

The property located immediately to the south of the subject site, McKesson Chemical Company, 9005 Sorenson Avenue, Santa Fe Springs, California, is listed on the California Department of Health Services' (DHS) Bond Expenditure Plan (BEP). Information obtained from DHS indicates that McKesson Chemical Company is in the process of completing a remedial investigation for this site. The remedial investigation report is anticipated to be available to the public in March 1991.

Preliminary investigations for McKesson Chemical Company, which are currently available at DHS's Burbank office, were reviewed in August 1990. These investigations indicated that chemicals formerly stored in on-site above and underground storage tanks were detected in a perched aquifer at 22 feet (possibly a seasonal water table) and in soils in the vicinity of the above ground tanks. Chemicals stored in the above ground tanks at McKesson included: ethylene glycol, propylene glycol, glycol ether, ethylbenzene, 1,1,1-trichloroethene, methylene chloride, and tetrachloroethene (PERC).

Liquid Air at 8832 Dice Road, Santa Fe Springs, California is located immediately west of the subject site. Water and residues from acetylene production were observed in a unlined pit on this property. The pit is adjacent to and could pos-

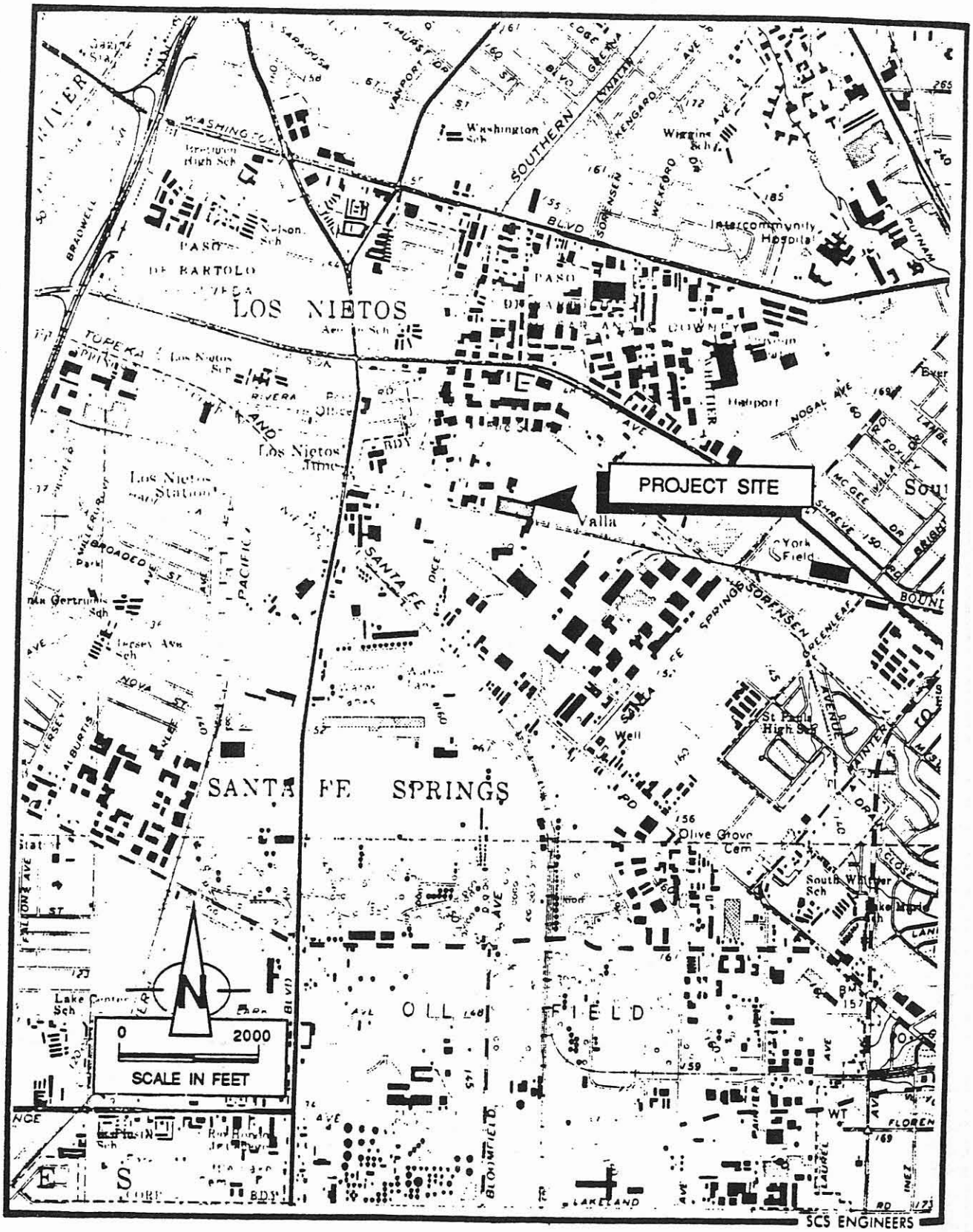

Figure 1. Map Showing Location of Project Site.

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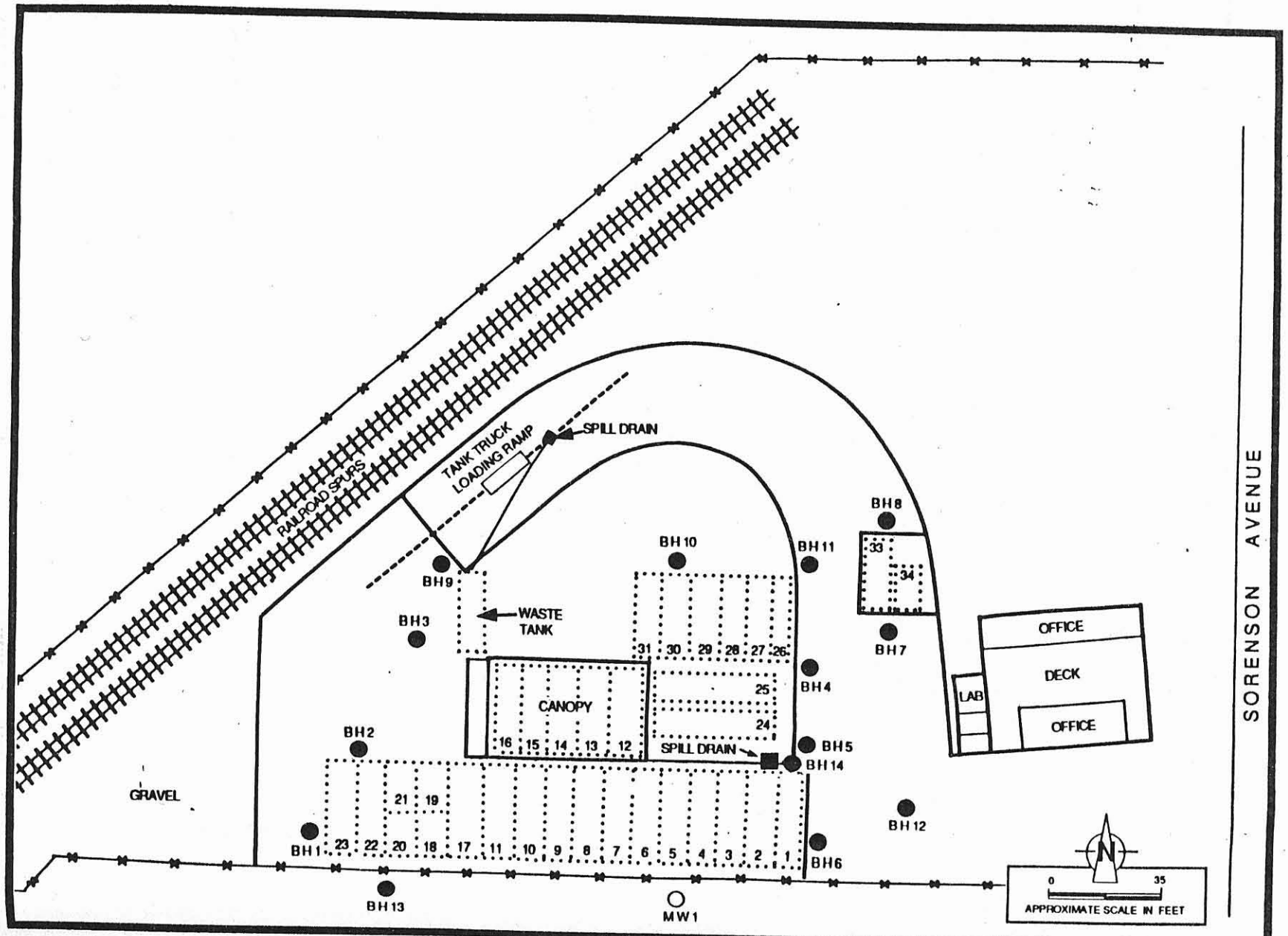

Figure 2. Approximate Locations of Soil Borings and Ground Water Well at

Each sample was identified with a chain-of-custody sample tag and placed in a refrigerated cooler for transport to the SCS Analytical Laboratory. Chain-of-custody forms were appropriately completed by our field geologist to ensure proper and accurate tracking/analysis in the laboratory. Specific data regarding project number, sample location, and analyses to be performed were recorded on the chain-of-custody forms.

Sample Collection - April 5, 1990

Based on field observations and analytical results for samples collected in boring BH6, further on-site investigation was recommended in the vicinity of a spill drain, which is located near the southeast corner of the tank farm. On April 5, 1990, concrete approximately eight inches thick adjacent to the concrete spill drain was cut and removed in order to expose the surrounding soils. Soils consisted of black and brown sandy clays, with strong hydrocarbon odors. OVA readings ranged from 400 to 700 parts per million (ppm). Due to the spill drain's proximity to the underground storag tanks, further safe excavation was not possible. Therefore, further exploration by drilling was recommended.

+ Check results

Drilling and Soil Sample Collection - June 25-26, 1990

Seven exploratory borings were drilled from June 25-26, 1990. One of these borings (MW1) was converted to a ground water monitoring well on June 26, 1990; this and the others (BH9 through BH14) are shown on Figure 2. Borings drilled on June 25, 1990 were installed with a 7 inch hollow stem auger to depths of 30, 20.5, 35, 34 and 40 feet. These borings were drilled using a Mobile B-47 drill rig. Soil samples were collected at five feet intervals.

On June 26, 1990, borings MW1 and BH14 were drilled to depths of 60 feet and 40 feet, respectively. Boring MW1 was drilled utilizing 11-inch hollow stem auger. BH14 was drilled using a 7-inch hollow stem auger. These borings were drilled using a Mobile B-61 drill rig. Soil samples were collected at five foot intervals, and were retrieved and logged using the same procedure described above.

Well Installation

One ground water monitoring well was constructed on-site in borehole MW1 using 4-inch diameter Schedule 40 PVC well pipe. Casing sections were joined using flush-set, threaded pipe connections; no glue connections were used.

Factory slotted 4-inch diameter PVC casing with 0.020-inch

slots was placed at the bottom of the well, with blank 4-inch diameter PVC pipe above. A flush-mounted, threaded end cap was placed on the bottom of the 15 foot perforated section. The top of the perforated zone extended approximately 5 feet above the existing water level in order to accommodate the anticipated seasonal water level fluctuations at the site.

During installation, the 4-inch PVC pipe was set inside the auger in order to prevent caving of the hole prior to installation of the casing. The annular space surrounding the well screen was filled with a filter pack (Montery Sand No.3) to about 3 feet above the top of the screened interval and capped off with a bentonite seal (3 feet thick). The sand was slowly poured into the annular space between the PVC pipe and the steel casing to prevent bridging.

Upon completion of the installation of the filter pack and bentonite seal, the augers were removed from the boring. The balance of the annular space surrounding the blank casing was filled with a cement/bentonite slurry to about 1 foot below grade. The top of the well was cemented and set with a locking field monument cover to prevent surface water intrusion.

Well logs for this site showing well construction details and sediment encountered during installation are provided in Appendix A.

Well Development

In order to obtain maximum well life and to assure representative samples of ground water, the monitoring well was developed by surging and bailing to remove the finer material from the formation and filter pack surrounding the well until it produced clean water (i.e. water with no observable fine material).

Wells were surged on June 27, 1990 by H-F Drilling. Each well was initially bailed using a large diameter bailer to remove sediment from the well. Bailing was followed by surging with a cylindrical surge block for about 30 minutes. Surging loosens the finer materials within the formation and pulls it into the well casing, where it can be removed from the well.

Approximately 110 gallons (over 9 well volumes) of water were removed from MW1. All of the ground water produced during the well development operations was stored in 55 gallon drums.

Equipment used in well development was decontaminated by

washing thoroughly in a TSP and water solution and rinsing in distilled water, or was steamed cleaned, prior to its use in the well.

Water Sampling

After development, 45 additional gallons of water (approximately 4 casings volumes) were purged from the well and ph, electroconductivity, and temperature were measured in order to verify that a representative water sample from the formation was obtained. After field readings had stabilized, ground water was collected from the well by lowering a 3-inch stainless steel sampler into the well. Samples and duplicates were placed in 40 ml sample bottles supplied by the laboratory. Immediately upon collection, samples were labelled and logged. Chain-of-custody documentation was completed for each sample. Samples were stored in a field cooler until their delivery to the SCS Analytical Laboratory in Long Beach, California.

All sampling equipment coming in contact with ground water was thoroughly cleaned prior to and after sampling by washing with in a TSP solution and double rinsing with distilled water.

ON-SITE GEOLOGY AND HYDROGEOLOGY

Soils encountered on the north side of the site to a depth of approximately 18 feet consisted of silts, clayey silts, and silty sands. Below 18 feet, soils consisted of medium to coarse grained sands and gravel. On the south portion of the site soils consisted of silts and silty sands to a depth of approximately 18 feet. Below this there was a thin layer of medium to coarse sands approximately five feet thick. Below this layer of medium to coarse sands, finer sediment such as clays, silts, and sandy silts were encountered to a depth of approximately 45 feet. Medium-grained and medium to coarse grained layers of sand were encountered from 45 feet to 60 feet (total depth for borehole MW1).

Based on observation of soils and depths to ground water within the borings it appears that there may be a separate perched water table on the north side of the subject site. Ground water was encountered on the northern portion of the subject site at a depth of approximately 32 feet during the drilling activities in June 1990. Water on the southwestern portion of the property was encountered at depths of approximately 45 feet. This deeper ground water is believed to be in the Gage aquifer.

The regional groundwater flow direction for this area is generally to the southwest. No site-specific information is available to determine the flow direction of ground water in the potential perched aquifer or the Gage aquifer underlying the site.

ANALYTICAL RESULTS

Subsurface Soil Samples

Of the 84 subsurface soil samples retrieved from the exploratory borings, 60 were selected for analysis. Samples were selected based on the presence of odors and staining. The remaining samples were archived for possible later analysis. Selected samples were analyzed for volatile organic compounds as determined using EPA Method 8240.

The laboratory results and chain-of-custody documentation for soil samples collected from the site are presented in Appendix B. A summary of the results are presented in Tables 1 and 2.

Fourteen different volatile compounds were found in the subsurface soils. These compounds include: acetone, benzene, 2-butanone (methyl ethyl ketone [MEK]), 1,1 dichloroethane (1,1-DCA), 1,1 dichloroethene (1,1-DCE), ethlybenzene, methylene chloride, 4-methyl-2-pentanone (methyl isobutyl ketone [MIBK]), tetrachloroethene (PERC), toluene, 1,1,1-trichloroethane (1,1-TCA), trichloroethene (TCE), and xylenes.

Acetone was only detected during the subsurface sampling conducted in June 1990. Acetone was detected at concentrations ranging from 55,000 ug/kg (parts per billion - ppb) in sample BH14-35 to 85 ug/kg in sample MW1-35. Benzene was detected at concentrations ranging from 15,000 ug/kg in sample BH14-35 to 11 ug/kg in sample BH6-15. MEK was detected at concentrations ranging from 29,000 ug/kg in sample BH14-10 to 40 ug/kg in sample BH6-10. 1,1-DCA was detected at concentrations ranging from 310 ug/kg in sample BH6-40 to 18 ug/kg in sample BH7-10. 1,1-DCE was detected at concentrations ranging from 680 ug/kg in BH6-45 to 21 ug/kg in sample BH7-10. Ethylbenzene was detected at concentrations ranging from 45,000 in sample BH14-5 to 13 ug/kg in BH6-20.

Methylene Chloride was also only detected in samples collected and analyzed in June and July 1990. Methylene chloride was detected at concentrations ranging from 10,000 ug/kg in sample MW1-30 to 300 ug/kg in BH13-40. MIBK was detected

TABLE 1. SUMMARY OF ANALYTICAL RESULTS FOR ORGANIC COMPOUNDS - JANUARY 1990

Sample	Benzene	1,1-DCA	1,1-DCE	EB	MEK	MIBK	PERC	Toluene	1,1,1-TCA	TCE	Xylene
	(ug/kg)										
BH1-5	--	--	--	--	--	--	--	--	--	--	--
BH1-10	--	--	--	--	--	--	--	--	--	--	--
BH1-15	ND	ND	ND	ND	ND	ND	ND	19	ND	ND	ND
BH1-20	ND	ND	ND	ND	200	180	16	21	18	ND	12
BH2-5	--	--	--	--	--	--	--	--	--	--	--
BH2-10	21	76	29	87	ND	ND	210	250	91	40	412
BH2-15	ND	ND	ND	ND	ND	60	ND	12	ND	ND	ND
BH2-20	--	--	--	--	--	--	--	--	--	--	--
BH3-5	ND	62	ND	62	ND	230	120	440	19	10	450
BH3-10	ND	ND	ND	ND	ND	ND	ND	160	ND	ND	70
BH3015	ND	ND	ND	ND	110	370	ND	28	ND	ND	ND
BH3-20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH4-5	ND	98	ND	ND	ND	ND	ND	150	65	ND	ND
BH4-10	--	--	--	--	--	--	--	--	--	--	--
BH4-15	ND	ND	ND	ND	ND	ND	ND	33	39	ND	ND
BH4-20	ND	ND	ND	ND	ND	980	ND	ND	ND	ND	ND
BH5-5	ND	ND	ND	42	1800	2100	ND	160	ND	ND	177
BH5-10	ND	ND	ND	53	640	2100	30	360	30	ND	163
BH5-15	ND	ND	ND	ND	600	1300	ND	35	ND	ND	15
BH5-20	ND	ND	ND	ND	300	600	ND	12	ND	ND	ND
BH6-5	ND	ND	ND	71	110	120	ND	>700	ND	16	340
BH6-10	ND	ND	ND	ND	40	120	ND	40	ND	ND	13
BH6-15	11	25	ND	220	1300	1900	330	1900	230	60	>2300
BH6-20	ND	ND	ND	13	240	600	26	150	29	ND	67
BH6-25	ND	ND	ND	ND	110	450	ND	32	ND	ND	10
BH6-30	ND	240	ND	260	1000	2000	750	870	45	ND	1650
BH6-35	16	39	ND	ND	200	620	ND	26	ND	ND	12
BH6-40	160	310	270	220	1200	2300	150	820	720	33	530
BH6-45	160	180	680	1100	750	2200	940	1600	900	87	2570
BH6-50	67	56	31	39	ND	1200	10	65	18	ND	123
BH7-5	--	--	--	--	--	--	--	--	--	--	--
BH7-10	120	18	21	ND	ND	ND	20	20	11	ND	13
BH7-15	46	ND	ND	ND	ND	ND	ND	ND	71	ND	ND
BH7-20	ND	ND	ND	ND	ND	ND	ND	28	ND	ND	ND
BH8-5	--	--	--	--	--	--	--	--	--	--	--
BH8-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH8-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH8-20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1. Refer to Figure 2 for sample locations.
2. EB = ethylbenzene, MEK = 2-butanone, MIBK = 4-methyl-2-pentanone, PERC = tetrachloroehtene
   1,1,1-TCA = 1,1,1-trichloroethane, TCE = trichloroethene.
3. ND = not detected.

TABLE 2. SUMMARY OF ANALYTICAL RESULTS FOR ORGANIC COMPOUNDS - JUNE 1990

Borehole	Acetone	Benzene	MEK	1,1-DCA	1,1-DCE	EB	MethChlo	MIBK	PERC	Toluene	1,1,1-TCA	TCE
	(ug/kg)											
BH9-5	550	ND	120	30	ND	37	460	450	37	410	56	20
BH9-15	ND	ND	ND	24	ND	32	730	ND	ND	190	ND	ND
BH9-25	380	ND	390	ND	ND	ND	ND	170	ND	ND	ND	ND
BH10-10	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH10-20	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH11-25	1300	ND	ND	ND	ND	ND	ND	ND	ND	59	ND	ND
BH11-30	ND	ND	500	ND	210	11000	ND	ND	ND	10000	1200	76
BH11-35	ND	ND	ND	81	130	1400	ND	700	330	1900	1000	ND
BH12-10	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH12-20	8600	ND	ND	ND	ND	ND	ND	54	ND	ND	ND	ND
BH13-15	6900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH13-30	1300	ND	ND	ND	ND	ND	ND	ND	90	ND	210	ND
BH13-40	11000	ND	530	ND	160	ND	300	150	230	98	280	120
BH14-5	ND	ND	ND	ND	ND	45000	ND	ND	ND	67000	ND	8700
BH14-10	41000	ND	29000	ND	ND	ND	ND	ND	ND	98000	ND	8400
BH14-15	ND	ND	ND	ND	ND	9300	ND	ND	8900	27000	2300	ND
BH14-20	50000	ND	ND	ND	ND	44000	ND	ND	48000	150000	28000	ND
BH14-25	39000	ND	ND	ND	ND	17000	ND	ND	19000	37000	ND	ND
BH14-30	31000	10000	ND	ND	ND	ND	7800	9300	ND	3300	ND	ND
BH14-35	55000	15000	ND	ND	ND	ND	ND	6300	ND	1600	ND	ND
BH14-40	ND	ND	ND	ND	ND	3600	ND	ND	1400	2400	1800	ND
MW1-10	21000	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND
MW1-15	7900	ND	ND	21	92	ND	ND	ND	49	ND	150	ND
MW1-20	8400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1-25	430	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1-30	15000	ND	ND	240	ND	2200	10000	ND	6300	330	3500	270
MW1-35	85	16	ND	39	ND	ND	6800	ND	ND	ND	ND	180
MW1-40	15000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Soil Sample												
S-1	ND	ND	ND	ND	ND	>210000	ND	ND	32000	>220000	6400	9900
S-2	ND	ND	ND	ND	ND	94000	ND	ND	33000	120000	ND	5100
Water Sample												
	(ug/l)											
MW1-1	--	10	--	21	270	ND	ND	--	100	10	120	210
MCLs	--	1	--	5	6	680	NA	--	5	100	200	5

Notes:

1. Refer to Figure 2 for sample locations.
2. EB = ethylbenzene, MEK = 2-butanone, MIBK = 4-methyl-2-pentanone, PERC = tetrachloroehtene 1,1,1-TCA = 1,1,1-trichloroethane, TCE = trichloroethene.
3. ND = not detected.
4. NA = not applicable.
5. MCLs = Maximum Contaminant Levels as established in California Code of Regulations Title 22.
6. trans-1,2-dichloroethene was also detected in the water sample at a concentration of 240 ug/l (MCL = 10 ug/l).

at concentrations ranging form 9,300 ug/kg in sample BH14-15 to 54 ug/kg in sample BH12-20. PERC was detected at concentrations ranging from 48,000 ug/kg in sample BH14-20 to 10 ug/kg in sample BH6-50.

Toluene was detected at concentrations ranging from 150,000 ug/kg in sample BH14-20 to 12 ug/kg in samples BH2-15 and BH5-20. 1,1,1-TCA was detected at concentrations ranging from 28,000 ug/kg in BH14-20 to 11 ug/kg in BH7-10. TCE was detected at concentrations ranging from 8,700 ug/kg in sample BH14-5 to 10 ug/kg in sample BH3-5. Xylene was detected at concentrations ranging from 233,000 ug/kg in sample BH14-5 to 10 ug/kg in sample BH6-5.

Grab Samples

Grab samples S-1 and S-2, collected near a broken pipeline, which was connected to the spill drain, contained elevated concentrations of ethylbenzene, PERC, toluene, 1,1,1-TCA, TCE, and xylene.

Ethylbenzene was detected at concentrations of greater than 210,000 ug/kg, and at 94,000 ug/kg in samples S-1 and S-2, respectively. PERC was detected at concentrations of 33,000 ug/kg and 32,000 ug/kg in samples S-2 and S-1, respectively. Toluene was detected at concentrations of greater than 220,000 ug/kg and 120,000 ug/kg in samples S-1 and S-2, Respectively. 1,1,1-TCA was detected at a concentration of 6,400 ug/kg in sample S-1. TCE was detected at concentrations of 9,900 ug/kg and 5,100 ug/kg in samples S-1 and S-2, respectively. Xylene was detected at concentrations of greater than 540,000 ug/kg, and at 264,000 ug/kg in samples S-1 and S-2, respectively.

In addition, sample S-2 contained a concentration of 99 mg/kg (parts per million-ppm) of total petroleum hydrocarbons (TPH) as determined using EPA Method 418.1.

Ground Water Samples

Ground water sample MW1-1, collected from MW1, was analyzed for EPA 624 components volatile organic compounds (VOCs). Analytical reports are contained in Appendix B and Table 2.

The following EPA 624 compounds were detected in the ground water sample analyzed (MW1-1): benzene, 1,1-DCA, 1,1-DCE, PERC, toluene, 1,1,1-TCA, TCE, and xylene. Benzene was detected at a concentration of 10 ug/l. 1,1-DCA and 1,1-DCE were detected at concentrations of 21 ug/l and 270 ug/l,

respectively. PERC and toluene were detected at concentrations of 100 ug/l and 10 ug/l, respectively. 1,1,1-TCA and TCE were detected at concentrations of 120 ug/l and 210 ug/l, respectively. Xylene was detected at a concentration of 18 ug/l.

SUMMARY AND CONCLUSIONS

Subsurface Soils

Results of this investigation indicate that elevated concentrations of VOCs exist in subsurface soils in the vicinity of the underground storage tank farm, primarily in the vicinity of a spill drain located in the east central portion of the site. Based on field observations and analytical data, it appeared that the highest concentrations of contaminants were present near a broken pipeline which was connected to this spill drain.

Elevated levels of ethylbenzene, PERC, toluene, and xylene were detected in the grab samples which were retrieved in the vicinity of the broken pipeline. Samples collected to a depth of 40 feet in BH14, which was drilled adjacent to the broken pipe line, also contained the most elevated concentrations of VOCs. Contaminants identified at a depth of 40 feet were an order of magnitude smaller than those identified near the surface.

BH6, which was drilled approximately 22 feet southeast of the broken pipe at the spill drain, contained the next most elevated levels of contaminants. Borings BH1, BH2, BH3, and BH9, drilled to depths of 20 or 25 feet near the western portion of the property did not contain significant levels of contamination.

In addition, borings BH7 and BH8 drilled adjacent to the underground fuel storage tanks (Tanks 33 and 34) also did not contain any significant levels of contamination. With the exception of borings drilled in the vicinity of the broken pipeline at the spill drain, borings drilled to a depth of 20 feet on the subject site did not show any significant levels of contamination in the soil.

Based on this information, and the fact that recent tank integrity tests and inventory records have not identified any leaking underground storage tanks, it appears that the broken line near the spill drain, was the source for the contamination identified in soils near the southeast corner of the tank farm. The purpose of this piping remains unknown. The

piping was plugged with concrete where it penetrates the spill drain.

Ground Water

Elevated levels of VOCs were also detected in sample MW1-1. Benzene, 1,1-DCA, 1,1-DCE, PERC, TCE, and trans-1,2-DCE were all detected at concentrations considerably above their respective maximum contaminant level (MCL). In addition, toluene, 1,1,1-TCA and xylene were detected at concentrations below their respective MCL or state recommended action level (AL).

With water level data from one well it is not possible to determine the direction of ground water flow beneath the subject site or whether ground water contaminants may have migrated from on-site or off-site sources. In addition, due to the variances in lithologies and depth to ground water encountered on-site, it appears that both a perched aquifer and the Gage aquifer were encountered during drilling. Based on present information it is not possible to determine if the two aquifers are hydraulically connected.

In addition, it is unknown what affect discharged water in the unlined pit at Liquid Air Products have on the ground water and soils beneath the subject site. Water discharged to the ground may alter ground water levels and flow direction. The chemistry of the discharged water is also unknown.

RECOMMENDATIONS

Additional ground water investigation is recommended for the subject site. Prior to such an investigation, SCS recommends review of the remedial investigation for the McKesson site, which will be available in March 1991. Information obtained from the McKesson remedial investigation would be beneficial for planning further investigative work at the subject site.

After review of this information, it is recommended that a work plan be prepared describing further ground water monitoring. This report is to be submitted to the lead regulatory agency.